

A NEW GENUS AND SPECIES OF PERILAMPIDAE (HYMENOPTERA: CHALCIDOIDEA) WITH UNCERTAIN PLACEMENT IN THE FAMILY

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Abstract

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A new genus and species of perilampid wasp is described from Yemen and Israel. The features of the adult do not allow for accurate placement within any of the existing subfamilies of Perilampidae. The adults are similar to Chrysolampinae; however, the mandibles have a 3/2 formula and although the ventral surface of the male scape has distinct pores, these are not isolated within pits or depressions, which is characteristic of Chrysolampinae and Perilampinae. The labrum is similar to most Perilampinae, but the prepectus is associated with the mesepimeron and not the pronotum. The ovipositor is strongly expanded at the apex and scimitar-shaped, whereas the ovipositor in all other Perilampidae is needle-like. The morphological features that relate to the potential phylogenetic placement of this genus in the perilampid/eucharitid complex are discussed.

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Introduction

The composition and higher level relationships of Perilampidae are uncertain. There has been debate over the inclusion of Akapalinae, Chrysolampinae, Echthrodapinae, and Philomidinae together with the more easily characterized Perilampinae within a single family (Ferrière and Kerrich 1958; Riek 1966; Graham 1969; Bouček 1972, 1983, 1988; Burks 1979; Bouček and Rasplus 1991; Darling 1986, 1995; Noyes 1990; Gibson et al. 1999). Echthrodapinae are now placed in Torymidae (Grissell 1995). Together or in part, these problematic subfamilies have also been proposed as a sister group or paraphyletic grade to Eucharitidae (Darling 1988, 1992; Gibson et al. 1999). Support for a close relationship between these groups is based almost entirely on morphology and behavior of the first-instar larva or planidium (Heraty and Darling 1984; Darling 1988, 1992; Heraty et al. 2004). The planidia of the eucharitid subfamilies, Gollumiellinae, Oraseminae, and Eucharitinae, are all very similar and several features support the monophyly of the Eucharitidae (Heraty and

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Darling 1984; Heraty et al. 2004). The life history and immature stages of Akapalinae, which has been placed in either Perilampidae or Eucharitidae, are unknown. In an analysis of 20 morphological features of immature stages, Chrysolampinae were sister to Philomidinae + (Perilampinae + Eucharitidae), with the latter three groups united by features of the planidium that include presence of a straplike tergite, absence of larval antennae, and an eversible postlabium (Darling 1992). Similar results were obtained from a combined larval and adult morphology dataset (Gibson et al. 1999). Initial results from molecular analyses with 28S-D2 ribosomal transcript supported monophyly of Eucharitidae (two genera), but not Perilampidae + Chrysolampinae, although with only four taxa sampled, the results are not reliable (Campbell et al. 2000).

Adults of Chrysolampinae and Perilampinae share two apomorphic features: one or more pores concentrated within distinct pits or depressions on the ventroapical surface of the male scape, and the gaster high and triangular in profile with the 2nd and 3rd gastral tergites subequal in size and fused medially (Darling 1986, 1997; Gibson et al. 1999). Philomidinae have been tentatively placed within Perilampidae (Noyes 1990, 2002), but other than possessing a similar compressed antennal flagellum and a similar gaster shape, there are no compelling adult characters to support this grouping. Similarly, the only adult feature of consequence grouping Perilampidae and Eucharitidae is the flap-like labrum with marginal setae (Darling 1988a); the labrum of Philomidinae is very different and more similar to Chalcidoidea (Darling 1988a; Gibson et al. 1999).

Chrysolampinae are easily recognized but difficult to define with synapomorphies. Apart from what defines Perilampidae as a whole, Chrysolampinae have only a single prominent synapomorphy — the mandibles each with two sharp apically positioned teeth (Bouček 1972, 1988; Darling 1986). Darling (1986, 1988) proposed that the flap-like structure of the labrum with marginal setae (and no digits) could be another synapomorphy, although some species that are referable to *Chrysolampus* have since been discovered to have a digitate labral margin, as is typical of Eucharitidae and some Perilampinae (Darling, unpublished).

Perilampinae are easily recognized and have a number of diagnostic and apomorphic features (Bouček 1978, 1988). Synapomorphies of Perilampinae include fusion or at least a very close association between the prepectus and pronotum, and pronotum with a dorsal collar (Bouček 1978). The labrum of Perilampinae is flap-like, digitate, and medially incised (Darling 1988). Most species also have a pair of aboral digits or sessile setae, and a pair of translucent areas that are interpreted as vestigial sockets (Darling 1988). The groundplan structure in Perilampidae is considered to be a fan-like labrum with marginal digits as in Eucharitidae, although aboral digits are possibly a groundplan feature (Darling 1988). Perilampinae all have 3/2 dentate mandibles, but this is likely plesiomorphic for Chalcidoidea (Bouček 1978).

Philomidinae do not help to resolve the relationships of Chrysolampinae and Perilampinae. The subfamily is highly autapomorphic in morphology. Adults share with Perilampidae a compressed, densely setose antennal flagellum, and the basal tergite (G₁) with distinct dorsal and lateral panels, but the labrum is sclerotized, flap-like, and broadly attached ventrally to the epipharynx with scattered surface setae (as in Chalcidoidea), the prepectus is swollen and shoulder-like, and the pronotum is reduced and obscured in dorsal view (Darling 1988; Heraty and Darling, unpublished). Like Chrysolampinae, the mandibles

are bidentate with sharp apical teeth. If Philomidinae are part of this same lineage, as suggested by the morphology of the first-instar larva, then the bidentate mandibles are potentially plesiomorphic for Chrysolampinae.

Recently, a species representing a new genus of chalcidoid wasp was collected in Israel and Yemen. It has features shared with both Chrysolampinae and Perilampinae that suggests that it may be either a plesiomorphic perilampid or a potential sister group to one or both of these subfamilies. Our purpose here is not to provide a final and formal placement of this genus, but to establish its name and provide a detailed discussion of important features as a prologue to more in-depth morphological and molecular studies that are in progress on the higher relationships of the perilampid-eucharitid complex.

Methods and Materials

Terms follow Darling (1988; for mouthparts), Heraty (2002), Gibson (1997), and Heraty and Quicke (2003; for ovipositor). Our terms differ in one major aspect involving the apex of the antennal flagellum. In many Chalcidoidea with an apparent 13-segmented antenna, the apical segment of the clava often has a small button-like apical sensillar area beyond flagellomere 11 (fl_{11} ; antennomere 13) that is differentiated to the same degree as between fl^{10} and fl^{11} , but with no multiporous plate sensilla (Fig. 2, fl_{12}). The archaic family Rotoitidae has a 14-segmented antenna (Bouček and Noyes 1988), and we consider this button-like structure in these and other Chalcidoidea as homologous to the 14th flagellomere of Rotoitidae. Therefore, a 14-segmented antenna is a more general condition across Chalcidoidea. Colour versions of the figure plates are accessible from JMH or <http://hymenoptera.ucr.edu>.

Jambiya vanharteni n. gen. and n. sp. (Figs. 1–23)

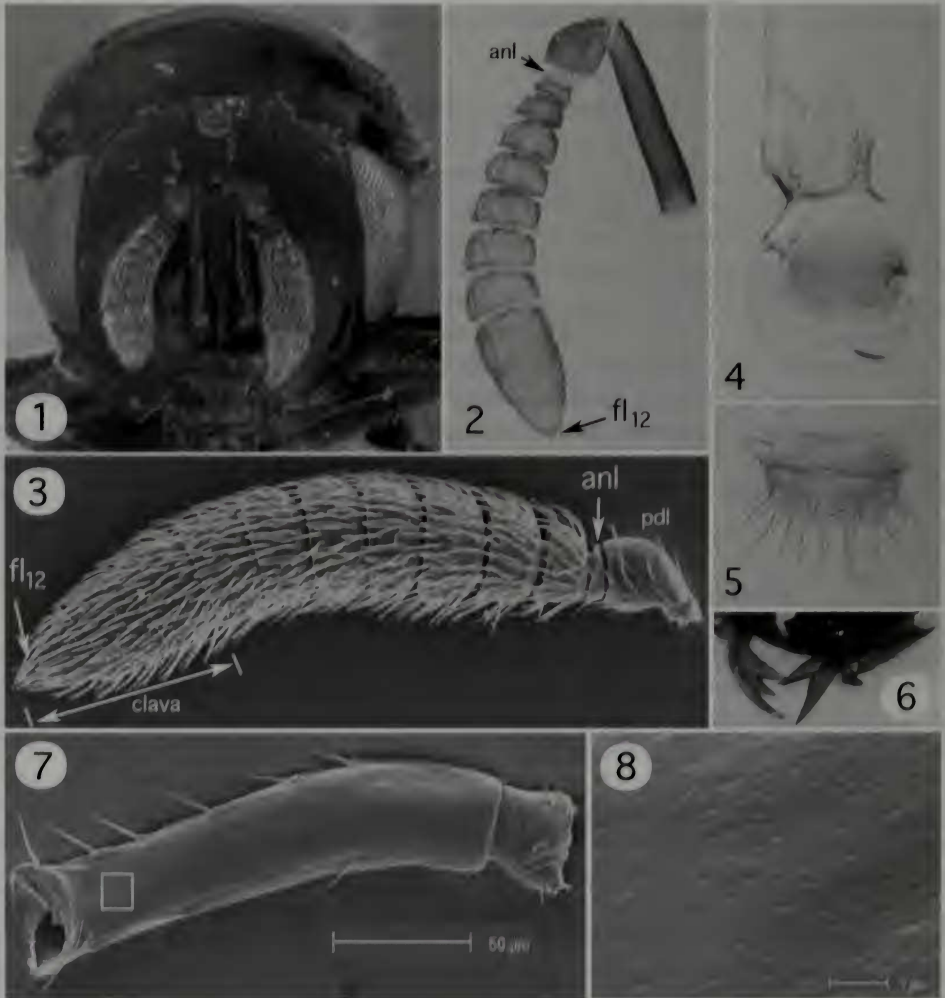
Etymology. *Jambiya* is treated as an arbitrary combination of letters; the gender is considered to be female. The name is based on the name of the small curved Yemeni dagger of the same name which is similar in form to the female ovipositor. The species is named after Tony van Harten, the collector of the specimens from Yemen.

Current placement. *Incertae sedis* within Perilampidae (see discussion below).

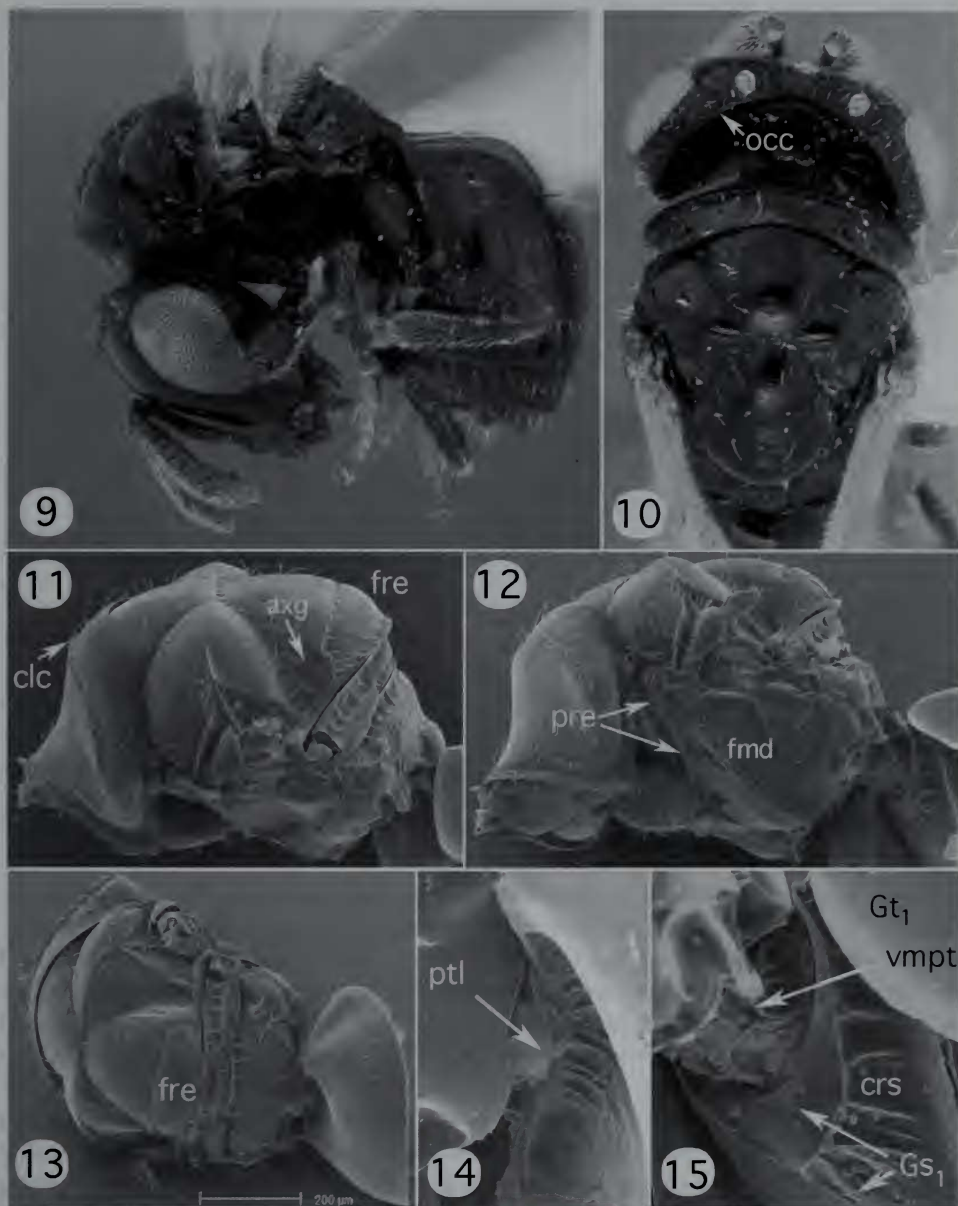
Diagnosis. In *Jambiya*, the mandibles are 3/2 toothed (Fig. 6), the epipharynx has a single pair of epipharyngeal setae (Fig. 4), the labrum is flap-like and digitate with paired aboral digits and translucent areas (Fig. 5), the petiole is membranous ventrally (Fig. 15), the ventral surface of the male scape has scattered minute pores without prominent pits or depressions (Figs. 7, 8), the mucro is long and acuminate (Fig. 20), and the ovipositor is apically expanded and dentate (Fig. 20). This genus is similar to *Chrysomalla* (Chrysolampinae), which also has the distinct carina demarking a pronotal collar and a ventrally membranous petiole, but differs in several key features considered as diagnostic of the subfamily. *Jambiya* differs from all known genera of Perilampinae by having the labrum not medially incised, ventral

surface of the male scape without any distinct pits (although minute pores are present), pronotum and prepectus + mesepisternum loosely articulated, ovipositor with the ventral valves expanded and flattened, and in several aspects of the forewing venation (parastigmal break, linear stigmal sensilla, short postmarginal vein). Without any congeneric species for comparison, all of the generic diagnostic features are also relevant for species recognition.

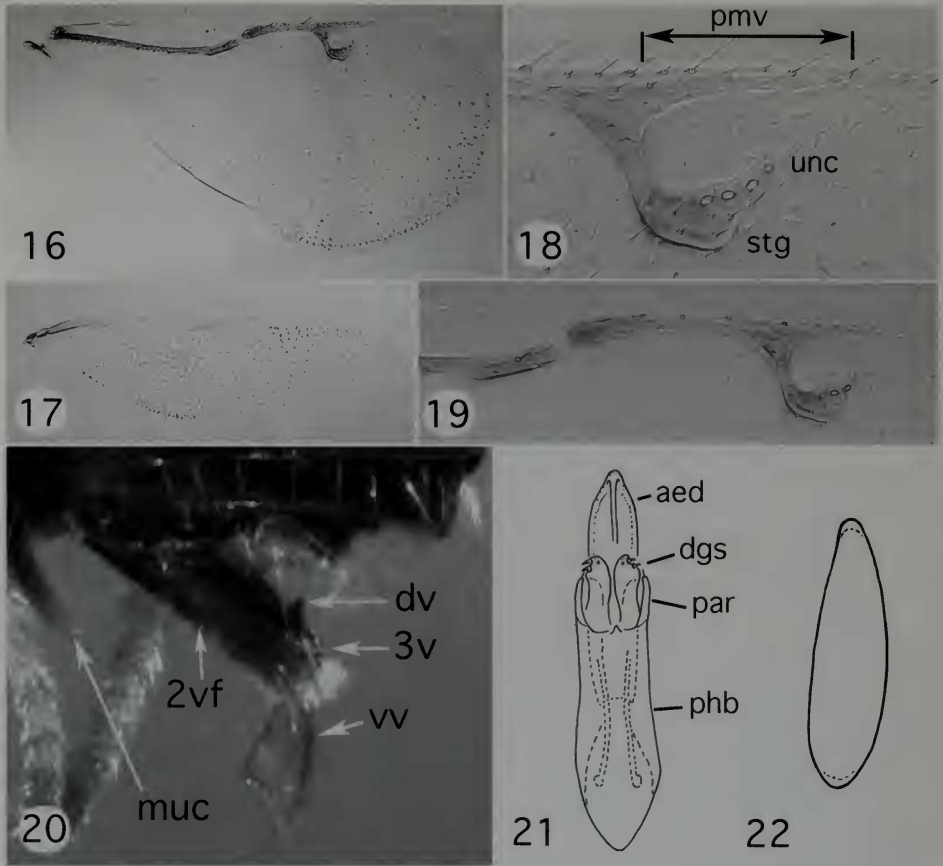
Female. Length 1.1-1.3 mm. Body color black with iridescent bluish reflections; tarsi pale brown; ovipositor valves light brown. Wings hyaline, forewing venation brown.



FIGURES 1-8. *Jambiya vanharteni*. 1—female head in frontal view; 2—female antenna; 3—male antenna; 4—epipharynx; 5—labrum; 6—mandibles; 7—male scape, ventral view; 8—closeup of inset box from Fig. 7. Abbreviations: anl—anellus; fl₁₂—flagellomere 12; pdl—pedicel.



FIGURES 9–15. *Jambiya vanharteni*. 9–female habitus; 10–female head and mesosoma, dorsal view; 11–13, male mesosoma: 11–subdorsal view, 12–sublateral view, 13–posterodorsal view; 14–petiole in dorsal view, closeup of Fig. 13; 15, petiole and first sternite in subventral view. Abbreviations: axg–axillular groove; clc–collar; crs–crenulate sulcus; fmd–femoral depression; fre–frenum; Gs₁–gastral sternite 1; Gt₁–gastral tergite 1; occ–occiput; pre–prepectus; vmpt–ventral margin of petiole.



FIGURES 16–22. *Jambiya vanharteni*. 16–forewing; 17–hind wing; 18–stigmal vein; 19–forewing vein; 20–apex of gaster, lateral view; 21–male genitalia, ventral view; 22–ovariolo. Abbreviations: aed–aedeagus; dgs–digitus; dv–dorsal valve; muc–mucro; par–paramere; phb–phallobase; pmv–postmarginal vein; stg–stigmal vein; unc–uncus; vv–ventral valve; 2vf–second valvifer; 3v–third valvula.

Head. Rounded in frontal view (Fig. 1); eyes bare; median ocellus anterior to lateral ocelli. Frons and lower face smooth and shining with scattered semi-erect setae; ocellar-ocular depression absent; scrobal depression finely reticulate, shallow with rounded lateral margins, and extending $2/3$ distance to median ocellus; vertex lateral to ocelli transversely strigate; occiput circularly colliculate (Fig. 6), dorsal occipital margin with a sharp carina (Fig. 10, occ), carina extending to oral fossa although partially obscured ventrally by fine postgenal striae. Clypeus smooth with few scattered short setae, margins demarked dorsally and laterally by weakly impressed smooth sulci that are rounded at dorsolateral margins of clypeus (clypeus nearly semicircular), clypeal margin slightly rounded with a transverse shelf (Fig. 1); supraclypeal area indistinct. Malar sulcus demarked by a weak carina (Fig.

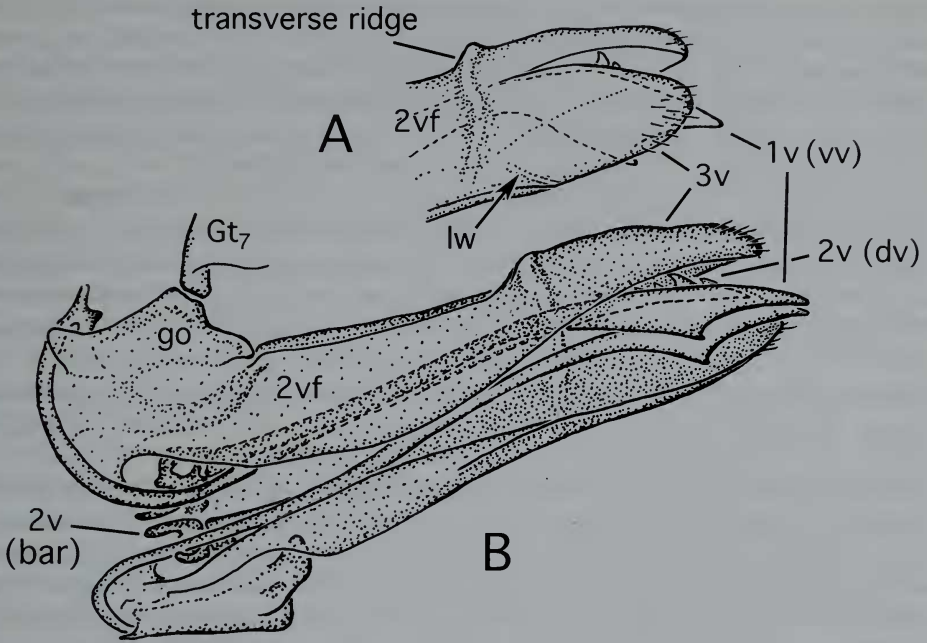


FIGURE 23. *Jambiya vanharteni*, ovipositor: A—dorsolateral view of apex; B—ventrolateral view. Abbreviations: dv—dorsal valve; go—gonangulum; Gt₇—gastral tergites 7; lw—line of weakness between third valvula and second valvifer; trs—triangular sclerite; v—valvula; vf—valvifer; vv—ventral valve.

6); hypostomal lobes broadly separated. Mandibles opposing, 3/2 dentate with teeth long and subequal (Fig. 6), basal articulation with gena membranous medially. Oral fossa broad. Epipharynx with single pair of stout epipharyngeal setae (Fig. 4). Labrum with 9 marginal acuminate digits, 2 aboral digits and 2 medial aboral translucent areas/vestigial sockets (Fig. 5); palpi 4/3 segmented. Antenna 14-segmented; scape narrow and elongate with no indication of ventral pits or pores in slide mounted antenna; anellus transverse (Fig. 2, anl); length of flagellum less than height of eye; funicle 7-segmented, all segments broader than long and slightly increasing in width apically; clava with four distinct, partially fused segments, apical segment (fl₁₂) small and button-like; multiporous plate sensilla large and numerous on all flagellomeres except flagellomeres 1–2 and flagellomere 12 (Figs. 2, 3); numerous socketed setae on pedicel and flagellum.

Mesosoma. Pronotum with distinct transverse collar demarked by a transverse carina (Figs. 9–12, clc); collar swollen and projecting laterally anterior to spiracle (Fig. 13), anterior face imbricate and mostly bare, mostly smooth posterior to carina and with scattered semi-erect setae; pronotum overlapping mesoscutum (Fig. 11). Mesoscutum mostly smooth with scattered setae; notauli deeply impressed and converging but not meeting at midline (Figs.

10, 11). Scutoscuteellar sulci diagonal, meeting anteriorly at transscutal articulation; lateral axillar lobe rounded and smooth (Figs. 10, 11); scutellar disc smooth medially and weakly imbricate laterally, with scattered setae; axillular groove (axg) present but broad and only slightly raised above surface (Fig. 11). Frenal line present and complete dorsally; frenum (fre) broadly rounded, smooth medially and weakly striate laterally, extended only slightly over metanotum (Figs. 11–13). Metanotum with broad rounded flange laterally, overlapping propodeum but not overlapping propodeal spiracle (Fig. 13). Propodeum reticulate medially with a smooth nucha; spiracle separated from anterior margin by its diameter, margin of spiracle thick and raised (Figs. 11, 13); callus weakly sculptured with several long setae (Figs. 11, 12); metepimeral groove present and foveate. Femoral depression (fmd) broadly and shallowly impressed and weakly reticulate (Fig. 12); transepimeral sulcus present; transepisternal sulcus present and associated with a weak carina (Fig. 12); posterior margin of upper mesepimeron even and without any indication of the metathoracic spiracle. Prepectus (pre) associated with mesepimeron, not fused with pronotum, and in a different plane from pronotum (Fig. 12); dorsal half of prepectus ovoid with a broad foveate medial depression (Fig. 12), overlapping base of tegula (Fig. 12), ventral half strongly narrowed and associated with anterior inflected margin of mesepisternum; mesothoracic spiracle exposed and prominent (Fig. 12). Propleura broadly separated ventrally, meeting only near anterior margin (Fig. 12). Coxae smooth to weakly imbricate with scattered long setae; midcoxa less than half size of hind coxa, hind coxa semiglobose and with several prominent long hairs dorsally; femora expanded medially; tibiae densely setose; fore tibia obliquely truncate apically and with one large, curved, and bifid spur; mid tibia with a single long spur almost as long as basitarsus; hind tibia with two spurs, longest half as long as basitarsus; all tarsi 5-segmented; claws simple. Forewing venation distinct (Figs. 16, 18, 19); submarginal vein with 7 long setae dorsally; parastigma with hyaline break and 2 campaniform sensilla along posterior margin (Fig. 19); stigmal vein broadened apically and with distinct uncus and 4 campaniform sensilla, stigmal vein roughly perpendicular to forewing margin; postmarginal vein extending beyond stigmal vein, but equal in length to vertical height of stigmal vein (Fig. 18); basal area bare except for track of setae along cubital vein, speculum irregular (mostly setose), costal cell with dense short setae; disc with dense fine setae and distinct marginal fringe, setal tracts on wing disc absent (Fig. 16). Hind wing venation complete, no trace of basal vein (submarginal vein parallel and continuous); 3 hamuli; fringe present.

Metasoma. Petiole short and transverse, visible only as narrow smooth band dorsally (Fig. 14), ventrolateral margins of petiolar tergite (vmpt) not fused and petiole membranous ventrally (Fig. 15); membrane attaching to anterior margin of gastral sternite; not overlapping. Gastral terga smooth to very lightly coriaceous; basal tergites ($G_{1\&2}$) tightly appressed, following tergites distinctly overlapping and articulating; G_1 depressed medially, anteriorly with medial crenulate depression, laterally with irregular patch of setae (Fig. 13); following tergites with single row of prominent setae (Fig. 9). Cerci circular with 5 setae. Sclerotized epiproct absent. Basal sternite (G_s) with transverse crenulate sulcus (crs) and raised flat anterior region (Fig. 15); hypopygium with long, bare mucro (Fig. 20, muc). Ovipositor sheaths long and parallel (Fig. 20, 2vf and 3v), second valvifer fused dorsally with a strong internal ridge across dorsal apical margin (Fig. 23), third valvula (3v) separated from

second valvifer by oblique suture (Fig. 23, posterior ventral margin of 2vf indicated by arrow), and apically with tuft of setae; ventral valve abruptly expanded apically, laterally flattened and scimitar shaped with 2 apical prongs (Fig. 20, vv); dorsal valve apically with 2 pronounced basally-directed, keel-like spines (Fig. 20, dv, one spine showing) and a minute spine subapical to these.

Male. Length, 1.02 mm. Dark brown to black. Antennal scape smooth ventrally (Fig. 7), minute pores present on ventral surface of scape, but visible only at high magnification, and scape lacking pits or depressions surrounding pores (Fig. 8). Gt₉ subtriangular and setose. Genitalia elongate (Fig. 21); aedeagus articulating and with prominent apodemes; parameres long and thin with a single apical seta; digitus broad, rounded, and with 2 marginal spines.

Ovarian egg. (Fig. 22). Length 0.15-0.16 mm. Cylindrical without apical stalk or surface sculpture.

Holotype. Female: **YEMEN**, 12 km NW Manakhah, 05 May–17 June 2002, A. van Harten; deposited in CNCI. **Paratypes.** **YEMEN:** same locality and collector data, but 3 July–21 August 2001 (♀), 6 July–21 August 2002 (♀, 2♂; ♀ with slide mount of antenna and one set of wings, base of metasoma on card, ovipositor in vial on pin; ♂ with head on card and slide mount of wings, antenna and genitalia; body used for SEM); **ISRAEL:** Arava Valley, 0.2 km N Hazeva Field, N 30°46'56" E 35°14'39", 26-27 April 1996, 450 ft, school in small wadi, M. E. Irwin (♂). All specimens deposited in CNCI.

Discussion

We are confident that *Jambiya* belongs to the family Perilampidae. The problem remains as to which subfamily it should be associated with, or if it deserves a new subfamily status. Several features are of interest in the placement of *Jambiya* and also affect our current treatment of the existing subfamilies of Perilampidae.

Male scape. In all Perilampinae and Chrysolampinae, the ventral subapical region of the male scape has distinct pits that are usually visible using simple light microscopy (Darling 1986, 1983, 1988b). Each of these pits is associated with 1 or more pores that are likely associated with pheromone glands (Darling 1986); pores do not appear in the surrounding interstices. The male scape of Philomidinae is reticulate without any visible pores, even in slide mounts (Heraty and Darling, unpublished). Males of some Eucharitidae (some *Gollumiella*, *Psilocharis*, and *Neolosbanus*) have scattered ventral pores visible only in slide preparations or under high magnification using SEM (Heraty 1994, 2004), however these are never associated with pits. Males of *Jambiya* have minute pores scattered over the ventroapical surface that are visible only with SEM, and no pits (Figs. 7, 8); pores are absent in the female scape. The presence of these scattered pores is likely a plesiomorphic condition among the pteromaloid Chalcidoidea, and possibly all Chalcidoidea (Heraty, unpublished). The association of pores with distinct pits is the derived feature of Chrysolampinae and Perilampinae which is not present in *Jambiya*.

Antennal flagellum. The antennal flagellum is similar in Chrysolampinae and Perilampinae (cf. Figs 2, 3). The groundplan segmentation of the flagellum includes a distinct transverse anellus (fl_1), followed by seven articulated funicular segments (fl_{2-8}) that are usually broader than long and slightly increasing in width apically, and finally a four segmented clava (fl_{9-12}) with the flagellomeres fused but clearly demarked. The apical flagellomere (fl_{12}) is small and button-like. Multiporous plate sensilla (MPS) and numerous stout socketed sensilla are present on at least flagellomeres 4-11 and the MPS are always absent on the anellus and flagellomere 12. Although there are exceptions within Chrysolampinae (*Brachyelatus*, *Austrotoxeuma*), the flagellum is compressed and much shorter than the head height, and often barely extending to the clypeal margin. Philomidinae differ only in that some males have ventrally ramose antennae, whereas they are always simple in other Perilampidae. In Eucharitidae, the antennal flagellum is much more elongate, and fl_{12} is never present in the same form (may be a complete additional segment in some more derived taxa, cf. Heraty 2002). Except for the absence of MPS on the second flagellomere, the antenna of *Jambiya* is similar to that of most Perilampidae; however many of these features are found in other Chalcidoidea and it is difficult to ascertain which attributes are synapomorphic for Perilampidae.

Epipharynx. Chrysolampinae and Philomidinae have two patches of epipharyngeal seta, whereas Perilampinae, all Eucharitidae, and *Jambiya* have a single pair of stout setae. The polarity of this character is uncertain (Darling 1988).

Labrum. The labrum of *Jambiya* is similar in some regards to both Chrysolampinae and Perilampinae, but not Philomidinae. A weakly sclerotized, flap-like labrum with evenly placed digits along the apical margin is known for only some *Chrysolampus* (Darling, unpublished). In most Chrysolampinae, digits are absent and the setae are arranged evenly along the apical margin (Darling 1988a). Within Perilampidae, aboral digits and paired translucent areas are known only within Perilampinae (Darling 1988a). Furthermore, the labrum of Perilampinae is excised medially and arranged into two distinct lobes, with the translucent areas located along the inner margin of the lobes (Darling 1988a). Darling (1988a) proposed that aboral digits in Perilampinae were likely derived. Their presence in *Jambiya*, in combination with other characters, would suggest that aboral digits might be plesiomorphic for Perilampinae. The labral digits of *Jambiya* are finely tapered apically; they may be either tapered or spatulate in Chrysolampinae and Perilampidae; tapered digits are considered to be plesiomorphic (Darling 1988).

Pronotal-prepectal association. *Jambiya* and Chrysolampinae have the prepectus closely associated with the mesepimeron and broadly separated from the pronotum by a wedge-shaped gap along most of its anterior length (Fig. 12). The size of the gap is related to the orientation of the pronotum, and can be more correctly correlated with a close association of the prepectus with the mesepipleuron and not the pronotum. This form of the prepectus is typical for Pteromalinae, Torymidae, and other chalcidoids, and is presumed to be plesiomorphic. Philomidinae have a prepectus unique in Chalcidoidea. The articulation between the pronotum and prepectus is rigid and closely appressed, but the prepectus remains separate and uniquely overlaps the posteroventral margin of the pronotum. In

Perilampinae, Akapalinae, and Eucharitidae, the prepectus is more closely associated with the pronotum, and is fused to the pronotum in all Perilampinae (except *Steffanolampus*) and within Eucharitidae (Gollumiellinae and all Eucharitini) (Heraty 2002). Close association with eventual fusion of the pronotum and prepectus is considered the derived state (Heraty 2002).

Forewing venation. The wing venation of *Jambiya* is almost identical to that found in *Chrysolampus* or *Chrysomalla* (Chrysolampinae), including the presence of a hyaline break in the parastigma, shape of the stigmal vein and stigma, and length of the postmarginal vein (Figs. 16–19). The only difference is the linear arrangement of the campaniform sensilla along the unculus, which are clustered in Chrysolampinae (cf. Darling 1986). Perilampinae have no hyaline break, a distinctly different stigma, and a much longer postmarginal vein. The venation of Philomidinae is similar to Chrysolampinae, but without a hyaline break and they have numerous campaniform sensilla in the stigma that are arranged in a dense cluster (Heraty, unpublished).

Petiole. The petiole of *Jambiya* is short and smooth, with the ventral margins of the petiolar sclerite broadly separated by a membranous area, and the apex of the petiolar sclerite abuts with the anterior margin of the first gastral sternite (neither overlapping or inserted). A ventrally membranous petiole is found in *Chrysomalla* (Chrysolampinae) and females of *Indosema* and *Timoderus* (Eucharitidae: Oraseminae). A ventrally membranous petiole is known in some Pteromalidae (cf. Heydon 1989) and whether it is a derived or plesiomorphic state is uncertain. In taxa with a fused petiole (i.e. *Orasema* in Oraseminae), the sternal antecostal muscles attach between the crenulate sulcus of the first gastral sternite and the ventral midline of the petiole (Heraty, unpublished). However, in *Jambiya*, these same antecostal muscles divide anteriorly and attach to the ventrolateral margins of the sclerotized portion of the petiole, suggesting that the remnant of the ventral (first) sternite of the petiole has been split. If so, this could be an apomorphic state within Chalcidoidea, although it is potentially plesiomorphic for Perilampidae or Perilampidae + Eucharitidae.

Gastral tergites. Perilampinae and Chrysolampinae have the gaster usually high and triangular in profile, with the first and second tergites usually similar in size, fused dorsally, and Gt_2 has a large lateral panel (Darling 1986, 1997). In these two subfamilies, the margins of the basal two terga are abutting and non-overlapping dorsally. Philomidinae have the basal tergite longer than the second and also overlapping the second tergite; the basal tergite (Gt_1) has a lateral panel, but this may be associated more with the odd shape of the gaster, which is strongly compressed dorsoventrally. The basal gastral tergites of *Jambiya* are subequal in length and with Gt_1 abutting Gt_2 (Fig. 9). These terga are not fused, and there is no distinct lateral panel on Gt_1 . Although the basal tergite is broadly depressed medially, the gaster is rounded and not triangular (Fig. 9). Other than having closely associated and abutting basal tergites, the gaster of *Jambiya* is not similar to other Perilampidae.

Ovipositor. The ovipositor of *Jambiya* is unique within Chalcidoidea. The ovipositor valves in Chrysolampinae and Perilampinae are simple and needle-like. An expanded ovipositor with prominent ridges or spines is associated with oviposition into cavities formed in leaf

tissue occurs in the three subfamilies of Eucharitidae (Gollumiellinae, Oraseminae, and some Eucharitinae) and Akapalinae, although oviposition habits are unknown in this latter subfamily (Heraty 1994, 2002; Heraty et al. 2004). It is difficult to postulate a use for the peculiar ovipositor in *Jambiya*, however its form may suggest a habit of oviposition into leaf surfaces as is known for some Eucharitidae (Gollumiellinae, Oraseminae, and some Eucharitinae; Heraty 2002; Heraty and Quicke 1998). This raises the possibility that expanded ovipositor and leaf ovipositions are plesiomorphic for the perilampid/eucharitid complex.

Egg. *Jambiya* has a fusiform smooth egg (as inferred from ovarian eggs). Perilampinae have a fusiform egg with a sculptured surface (Heraty and Darling 1984; Darling and Roberts 1999) whereas Chrysolampinae have a fusiform, although slightly dumbbell-shaped egg, with a smooth surface (Darling and Miller 1991). The eggs of some Eucharitidae are fusiform and smooth, but most species have a stalked egg, both in the ovariole and after the egg is deposited (Heraty 1994, 2002). A fusiform egg is likely plesiomorphic.

None of the morphological features discussed above accurately places *Jambiya* within any of the perilampid subfamilies, and at best, the features of *Jambiya* confuse the putative synapomorphies of Chrysolampinae and Perilampinae. Although closest to Chrysolampinae, and especially the genus *Chrysomalla*, *Jambiya* lacks any of the defining characteristics of the subfamily. The antennae are similar in general form (antennal formula, compact flagellum, and dense setation) to all three subfamilies of Perilampidae, but the lack of pits on the male scape would seem to exclude this genus from either Chrysolampinae or Perilampinae. The single pair of epipharyngeal setae is shared with Perilampinae and Eucharitidae, but not Chrysolampinae or Philomidinae. The 3/2 mandibular formula excludes *Jambiya* from Chrysolampinae and Philomidinae. The labrum has a composite of features shared with Chrysolampinae and Perilampinae, but not Philomidinae. The pronotal-prepectal complex is likely plesiomorphic and uninformative. The wing venation is almost identical with some Chrysolampinae, but with a different arrangement of campaniform sensilla. Polarity is difficult to assess for the forewing vein features, but *Jambiya* is very different from either Philomidinae or Perilampinae. The petiole is membranous ventrally and similar to some Chrysolampinae and Eucharitidae, but the polarity of this feature is uncertain. The gastral tergites are closely associated and abutting, but otherwise it is not similar to other Perilampidae. The ovipositor is unique within Chalcidoidea, but has some similarities with Eucharitidae and Akapalinae that may be suggestive of oviposition into leaf tissue. Lastly, the egg is fusiform which is characteristic of Perilampinae and some Eucharitidae, but this is likely a plesiomorphic feature. In summary, *Jambiya* might well deserve subfamily status within Perilampidae. A combined morphological and molecular analysis is currently in progress which should resolve not only the placement of this enigmatic wasp, but also the phylogeny of the perilampid/eucharitid complex.

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